

Divider Rules

Electrical Engineering

Voltage and current dividers, and the loading that quietly breaks both.

Series elements divide voltage in proportion to resistance; parallel elements divide current in inverse proportion.

$$V_2 = V R_2 / (R_1 + R_2) \cdot I_1 = I R_2 / (R_1 + R_2)$$

9 V, 1 kΩ and 2 kΩ

6 V across 2 kΩ

The same divider

3 mA flows

9 ÷ 3000.

2 kΩ load added

Output falls to 4.5 V

Loading.

THE COMMON MISTAKE

✗ Using a divider as a small power supply

✓ Buffering it, or using a regulator

The ratio only holds while the load draws far less current than the divider itself. Any real load pulls the output down.

Rule of thumb: run at least ten times the load current through the divider, or the calculated ratio is fiction.